What is claimed is:

1. A packet scheduling method comprising:

(a) classifying a stream according to at least one of a data rate and a length of a packet;

(b) if the packet of the classified stream is a first packet, storing the packet in a first stream queue, and if the packet of the classified stream is a subsequent packet, storing the packet in a second stream queue;

(c) counting a virtual start service time of the packet stored in the first stream queue according to a weighted fairness queuing method; and

(d) counting a virtual start service time of the packet stored in the second stream queue as a virtual start service time of the previous packet.

2. The method of claim 1, wherein step (c) is performed in accordance with a WF^2Q or WF^2Q^+ algorithm.

3. The method of claim 2, wherein step (c) is performed in accordance with the following equation:

$$S_i^k = \max(V(a_i^k), F_i^{k-1}) \text{ (where } Q_i = 0),$$

where S_i^k is a virtual start service time of a k-th packet of an i-th stream, V(t) is a system virtual time function, a_i^k is an arrival time of the k-th packet of the i-th stream, F_i^{k-1} is a virtual finish service time of a (k-1)-th packet of the i-th stream, and Q_i is the quantity of the previous packet contained in a corresponding queue of the i-th stream.

4. The method of claim 1, wherein step (d) is performed according to a smallest eligible virtual finish time first (SEFF) strategy.

5. The method of claim 1, further comprising (e) detecting a legal packet whose virtual start service time is shorter than a system virtual service time by scanning the virtual start service time of the packets stored in the first stream queue and the second stream queue.

6. The method of claim 5, wherein step (e) comprises (e1) counting a virtual finish service time of the legal packet in accordance with the following equation:

$$F_i^k = S_i^k + \frac{L_i^k}{R_i(t)},$$

where F_i^k is a virtual finish service time of a k-th packet of an i-th stream, S_i^k is a virtual start service time of the k-th packet of the i-th stream, L_i^k is the length of the k-th packet of the i-th stream, and $R_i(t)$ is a rate of the i-th stream.

7. The method of claim 5, further comprising (f) transmitting the detected legal packet to a next node.

8. The method of claim 1, wherein the first stream queue of step (b) is classified according to a data rate of the stream.

9. The method of claim 1, wherein the first stream queue of step (b) is classified according to a length of the packet of the stream.

10. The method of claim 1, wherein the first stream queue of step (b) is classified according to a data rate of the stream and a length of the packet.

11. A packet scheduling apparatus comprising:

a classifier, operable to classify a stream according to at least one of a data rate and a length of a packet;

a first stream queue in which a first packet of the classified stream is stored;

a second stream queue in which a subsequent packet of the classified stream is stored; and

a SEFF selector, operable to detect a legal packet from all the packets stored in the first stream queue and the second stream queue according to a SEFF strategy.

12. The apparatus of claim 11, wherein the SEFF selector is operable to count a virtual start service time of the packet stored in the first stream queue according to a weighted fairness queuing method, and further operable to count a virtual start service time of the packet stored in the second stream queue as a virtual start service time of the previous packet.

13. The apparatus of claim 12, wherein a virtual time function of the scheduler is given by:

$$V(t+\tau) = \max(V(t)+\tau, \min_{i \in B(t)} S_i^{hi(t)}),$$

where V(t) is a virtual time function of the scheduler, τ is a time-interval of system virtual time renewal, B(t) is the assembly of all the streams to be backlogged in the scheduler, hi(t) is a serial number of a head packet of a data stream i, and S_i^k is a virtual start service time of a k-th packet.

14. The apparatus of claim 12, wherein the SEFF selector is operable to count a virtual start service time of the first stream according to the following equation:

$$S_i^k = \max(V(a_i^k), F_i^{k-1}) \text{ (where } Q_i = 0),$$

where S_i^k is a virtual start service time of a k-th packet of an i-th stream, V(t) is a system virtual time function, a_i^k is an arrival time of the k-th packet of the i-th stream, F_i^{k-1} is a virtual finish service time of a (k-1)-th packet of the i-th stream, and Q_i is the quantity of the previous packet contained in a corresponding queue of the i-th stream.

15. The apparatus of claim 12, wherein the SEFF selector is operable to count a virtual start service time of the second stream queue according to the following equation:

$S_i^k = F_i^{k-1}$ (where $Q_i \neq 0$),

where S_i^k is a virtual start service time of a k-th packet of an i-th stream, F_i^{k-1} is a virtual finish service time of a (k-1)-th packet of the i-th stream, and Q_i is the quantity of the previous packet contained in a corresponding queue of the i-th stream.

16. The apparatus of claim 12, wherein the SEFF selector is operable to scan the virtual start service time of the packets stored in the first stream queue and the second stream queue and detect a legal packet whose virtual start service time is shorter than a system virtual service time.

17. The apparatus of claim 16, wherein the SEFF selector is operable to count a virtual finish service time of the legal packet in accordance with the following equation:

$$F_i^k = S_i^k + \frac{L_i^k}{R_i(t)},$$

where F_i^{k-1} is a virtual finish service time of a k-th packet of an i-th stream, S_i^k is a virtual start service time of the k-th packet of the i-th stream, L_i^k is the length of the k-th packet of the i-th stream, and $R_i(t)$ is a rate of the i-th stream.

18. The apparatus of claim 11, wherein the first stream queue is classified according to a data rate of the stream.

19. The apparatus of claim 11, wherein the first stream queue is classified according to a length of the packet of the stream.

20. The apparatus of claim 11, wherein the first stream queue is classified according to a rate of the stream and a length of the packet.